

REMARKS

Favorable reconsideration of this application, as amended, is respectfully requested.

Claims 1–14 and 16–36 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Kaule (US 6,146,773) in view of Hofmann (US 4,791,017), Witzman (US 6,202,591) and Applicants' disclosure. Applicants respectfully traverse.

Additionally, Claim 1 has been amended to remove the features added by the previous amendment, i.e., the subject matter recited by original Claim 15. This material has been reintroduced as new Claim 37. Furthermore, Claims 1 and 37 have been amended to recite correcting deviations by adjusting, *inter alia*, an energy of an electron beam. Support for this amendment may be found, for example, in Paragraph 14 of the Specification (Pages 4–5). No new matter has been added. Thus, Claims 1–14 and 16–37 are pending.

The present invention provides a method for forming an imitated precious-metal coating that allows continued production of a constant color tone of the coating. Applicants note that continued production of a constant color tone over an extended period of time is not a trivial problem, as discussed in Paragraphs 6 and 11 of the Specification (Pages 2 and 3–4, respectively). Rather, in a vapor deposition process, the components of the alloy forming the precious-metal-colored coating have different vapor pressures and, therefore, evaporate at different rates. At a specific time, the composition of the vapor is not identical to the composition of the molten alloy, i.e., the vapor is richer in components having high vapor pressures, and, over time, the compositions of the molten alloy and the vapor change due to the different evaporation rates. As a result, the composition of a deposited coating also changes in the course of the production process. Since the color tone of the precious-metal-colored coating is dependent on the composition thereof, the color tone of the coating varies during its production process. Applicants submit that this imposes high demands on a coating process for a security element.

The present invention ensures generation of a constant color tone by accurately controlling the composition of the coating. This is achieved, on the one hand, by an exact determination of the coating composition, and, on the other hand, by a quick response to any detected deviation from the desired coating composition. As recited by Claim 1, the coating composition is determined by reflection measurement and deviations are corrected by adjusting the heating power or the energy of the electron beam (which changes the evaporation rate).

Applicants submit that neither the cited references nor Applicants' disclosure, taken either singly or in combination, teaches or suggests these features.

Kaule addresses an entirely different problem than the present invention, namely, a "security document and method for producing it which has a magnetic material whose magnetic properties are designed so that they are difficult to imitate" (Col. 1:5, 43-46). While Kaule discloses a security thread that has a magnetic layer of iron or nickel and an additional metallic layer that creates color effects, Kaule is silent with respect to the method for applying the additional metallic layer. The Office Action agrees that "Kaule does not expressly disclose how the colored metallic layer is produced," but then alleges that "it can be expected that the layer is produced with the same method as the layer of iron, that is, using resistance heating or electron beam evaporation" (Page 2). However, even assuming, *arguendo*, that the same application method is used for the magnetic and metallic layers, Kaule fails to teach or suggest determining the coating composition and then correcting deviations, as recited by Claim 1.

Instead, Kaule discloses that "the basic idea of the invention is to use a carrier as a security element which has been coated with a defined, low-coercive magnetic layer" (Col. 1:52-54), and that "the thickness of the magnetizable layer has substantially no influence on coercivity and can be adjusted between 0.05 and one microns with the usual choice of process parameters" (Col. 3:8-11). Since Kaule's magnetic layer thickness has substantially no influence on coercivity, Applicants submit that it is (obviously) not necessary to exactly control its thickness. Additionally, the composition of Kaule's magnetic layer, i.e., iron or nickel, does not vary since there is only one component, and, further, maintaining a constant color tone is not an issue within the magnetic layer. Therefore, even assuming that the metallic layer is applied in the same manner as the magnetic layer, Applicants submit that the metallic layer is not applied in the manner claimed in the present application. Accordingly, Kaule fails to teach or suggest all of the features recited by Claim 1.

Hofmann fails to cure the deficiencies of Kaule. In Hofmann's decorative articles, the gold or gold-containing surface layers are thin and subject to wearing away because the amount of gold is kept as small as possible (due to cost, for example). *See, e.g.,* Col. 1:14-25. To counter this effect, Hofmann provides a gold-colored underlayer that matches the color of, is harder than, and does not wear away as quickly as, the surface layer. Not only does Hofmann fail to discuss the importance of variations in the thickness and composition of the underlayer,

but it is also clear that minor variations in the coating layer thickness and composition, accompanied by variations in color tone, will not matter for this underlayer, which becomes visible only once the surface layer is worn away. *See, e.g., Col. 2:5–17.* The problem to be solved, then, in Hofmann's case, is one of color matching between two layers having a completely different chemical composition, i.e. a metallic layer and a layer of a carbonitride of titanium, zirconium, hafnium or vanadium, or hafnium nitride. *See, e.g., Col. 2:19–23.* Consequently, minor variations in color tone of the underlayer are negligible and may be tolerated.

Witzman fails to cure the deficiencies of either Kaule or Hofmann. Witzman discloses a vapor deposition process where "the heater power supply and/or substrate drive are regulated by a control circuit responsive to a coating control monitor that measures a property of the coating, which is indicative of the film thickness" (Col. 7:48–58). Witzman, however, is entirely silent with respect to controlling the color of a deposited coating. In fact, Witzman merely relates to producing coatings "having a high optical quality and being essentially free of defects from particulate ejected by the source material," and, in particular, to producing coatings for optical interference products. *See, e.g., Col. 5:26–35.* Most notably, single components, rather than multicomponent mixtures, are evaporated in Witzman's process. Therefore, variations in the composition of the deposited coatings is also not an issue in Witzman, and Applicant submit that Witzman, therefore, does not provide any guidance with respect to maintaining constant compositions and constant color tones in coatings made up of several components.

Applicants also submit that there is an essential difference between optimizing the appearance of the color of a coating and maintaining an optimized appearance of the color of the coating, in particular a constant color tone, during an extended vapor deposition process.¹ This is immediately evident when considering Figures 3a and 3b of the instant application (described in Paragraphs 53 and 54, respectively). As shown in the figures, a precious-metal-coloured coating is deposited on a film guided on a chill roll. In a security element production method, the film constitutes the substrate of the security element and may have considerable length. In previous methods, security elements formed at the beginning of the production

¹ The Office Action opines that "it would have been obvious to a person of ordinary skill in the art to control the amount of the copper and/or the rest of the metal(s) in the alloy, so as to optimize the appearance of the color of the coating" (Page 3).

process were somewhat different in color from security elements formed at the end of the production process, and the method of the present invention eliminates these disadvantages.

Accordingly, Claim 1 is allowable over Kaule, Hofmann, Witzman and Applicants' disclosure.² Furthermore, Claims 2–14 and 16–37, depending from Claim 1, are also allowable, at least for the reasons discussed above.³

In view of the foregoing amendment and remarks presented herein, Applicants respectfully submit that this application is in condition for allowance and should now be passed to issue.

A Notice of Allowance is respectfully solicited.

If any extension of time is required in connection with the filing of this paper and has not been requested separately, such extension is hereby requested.

The Commissioner is hereby authorized to charge any fees and to credit any overpayments that may be required by this paper under 37 C.F.R. §§ 1.16 and 1.17 to Deposit Account No. 02-2135.

Respectfully submitted,

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² Regarding Paragraph 12 of the Specification (Page 4), Applicants note that optical devices for measuring transmission and/or reflection are, of course, known to persons skilled in the art. However, Applicants have not invented an optical device, and submit that the use of such devices in a method for maintaining a constant color tone of a precious metal coloured coating was not known.

³ The Office Action alleges that "Claims 2–5, 8–11, 13, 17–20, 23–25 and 27–35 do not appear to contain any additional features which could lead to a subject matter that is novel" (Pages 2–3). Applicants disagree, and submit that these claims recite features that are not explicitly found within the references of record.